

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-48. (Canceled)

49. (Currently Amended) A laser unit for providing markings on a surface of a continuous strip of metal, said laser unit comprising:

a beam generator configured to generate a beam of laser radiation to provide said markings in a metal;

a beam focuser, associated with the beam generator, that focuses the laser beam onto said surface of said strip;

a beam deflector, associated with the beam focuser, that effects a controlled deflection of the laser beam, said beam deflector being arranged intermediate the beam generator and the beam focuser; and

a control unit having a memory that receives and stores a pattern to be engraved on said surface and a processor programmed to operate said laser unit to produce said pattern on said surface of said strip,

wherein:

said control unit is set to control said laser unit to provide laser engraved markings at exact locations on said surface when said strip intermittently is in an immobilized condition before being fed into a processing apparatus structured to mechanically shape the thus-marked strip into marked articles to be included in cans,

said beam generator is configured to produce laser pulses, and
an average power per pulse is at least 25 KW.

50. (Previously Presented) A laser unit as set forth in claim 49, wherein said laser unit is operable to provide about 1-5 μm deep engravings in said surface of said strip.

51. (Previously Presented) A laser unit as set forth in claim 49, wherein said processor is adapted to conjointly control said beam generator and said beam deflector such that at least one pulse of laser radiation outputted by the beam generator forms visible pits in said surface, so as to form a number of said pits in said surface to reproduce said pattern.

52. (Previously Presented) A laser unit as set forth in claim 51, wherein said processor is programmed to control a time period between subsequent pulses such that each pulse has sufficient energy to generate one of said pits.

53. (Previously Presented) A laser unit as set forth in claim 51, wherein said processor is adapted to, based on said pattern in said memory, calculate positions of all of said pits on said surface before operating said laser unit to produce said pattern.

54. (Previously Presented) A laser unit as set forth in claim 51, wherein said processor is programmed to determine an optimum engraving path in which the pits should be produced in the surface to form the pattern, such that the distance between subsequently engraved pits is minimized.

55. (Previously Presented) A laser unit as set forth in claim 49, wherein said pattern comprises a number of characters.

56. (Previously Presented) A laser unit as set forth in claim 55, wherein said processor is programmed to control the beam deflector such that said characters are provided sequentially one after another on said surface.

57. (Previously Presented) A laser unit as set forth in claim 49, wherein said marked articles are opening tabs to be attached to ends for cans.

58. (Previously Presented) A laser unit as set forth in claim 57, wherein said laser unit is operable to provide the laser engraved markings on said surface of said strip such that each of said marked tabs have said markings on a tab surface between an opening in said tab and bent edge portions of the tab.

59. (Previously Presented) A laser unit as set forth in claim 49, wherein said control unit is set to control the feeding rate of the strip into the processing apparatus.

60. (Currently Amended) A laser unit for providing markings on a surface of a continuous strip of metal, said laser unit comprising:

a beam generator configured to generate a beam of laser radiation configured to provide said markings in a metal:

a beam focuser, associated with the beam generator, that focuses the laser beam onto said surface of said strip;

a beam deflector, associated with the beam focuser, that effects a controlled deflection of the laser beam, said beam deflector being arranged intermediate the beam generator and the beam focuser; and

a control unit having a memory that receives and stores a pattern to be engraved on said surface and a processor programmed to operate said laser unit to produce said pattern on said surface of said strip,

wherein:

said processor is programmed to control said laser unit to provide a large number of visible pits in said surface to produce said pattern within a dwell time when the strip intermittently is in an immobilized condition, the dwell time being less than about 60 ms,

said beam generator is configured to produce laser pulses, and
an average power per pulse is at least 25 KW.

61. (Canceled)

62. (Previously Presented) A laser unit for providing markings on a surface of a continuous strip of metal, said laser unit comprising:

a beam generator configured to generate a beam of laser radiation to provide said markings in a metal;

a beam focuser, associated with the beam generator, that focuses the laser beam onto said surface of said strip;

a beam deflector, associated with the beam focuser, that effects a controlled deflection of the laser beam, said beam deflector being arranged intermediate the beam generator and the beam focuser; and

a control unit having a memory that receives and stores a pattern to be engraved on said surface and a processor programmed to operate said laser unit to produce said pattern on said surface of said strip,

wherein said control unit is set to control said laser unit to provide laser engraved markings at exact locations on said surface when said strip intermittently is in an immobilized condition before being fed into a processing apparatus structured to mechanically shape the thus-marked strip into marked articles to be included in cans, and

wherein the beam focuser comprises a lens having a focal length of between about 120-190 mm.

63. (Previously Presented) A laser unit as set forth in claim 62, wherein the focal length is between about 150-180 mm.

64. (Previously Presented) A laser unit for providing markings on a surface of a continuous strip of metal, said laser unit comprising:

a beam generator configured to generate a beam of laser radiation to provide said markings in a metal;

a beam focuser, associated with the beam generator, that focuses the laser beam onto said surface of said strip;

a beam deflector, associated with the beam focuser, that effects a controlled deflection of the laser beam, said beam deflector being arranged intermediate the beam generator and the beam focuser; and

a control unit having a memory that receives and stores a pattern to be engraved on said surface and a processor programmed to operate said laser unit to produce said pattern on said surface of said strip,

wherein said control unit is set to control said laser unit to provide laser engraved markings at exact locations on said surface when said strip intermittently is in an immobilized condition before being fed into a processing apparatus structured to mechanically shape the thus-marked strip into marked articles to be included in cans, and

wherein the beam generator is configured to generate the beam with a pulse duration of 25 nanoseconds in a cycle time of 0.1-1 μ s.

65. (Previously Presented) A laser unit for providing markings on a surface of a continuous strip of metal, said laser unit comprising:

a beam generator configured to generate a beam of laser radiation to provide said markings in a metal;

a beam focuser, associated with the beam generator, that focuses the laser beam onto said surface of said strip;

a beam deflector, associated with the beam focuser, that effects a controlled deflection of the laser beam, said beam deflector being arranged intermediate the beam generator and the beam focuser; and

a control unit having a memory that receives and stores a pattern to be engraved on said surface and a processor programmed to operate said laser unit to produce said pattern on said surface of said strip,

wherein said control unit is set to control said laser unit to provide laser engraved markings at exact locations on said surface when said strip intermittently is in an immobilized condition before being fed into a processing apparatus structured to mechanically shape the thus-marked strip into marked articles to be included in cans, and

wherein the beam generator includes a mode selection element to obtain suitable transverse mode characteristics.

66. (Previously Presented) A laser unit as set forth in claim 65, wherein the mode selection element comprises an iris diaphragm arranged to block outer portions of the beam.

67. (Previously Presented) A laser unit as set forth in claim 49, wherein a height of each of the characters is about 1.4-2 mm.

68. (Previously Presented) A laser unit as set forth in claim 49, wherein the beam generator is selected from the group consisting of YAG and CO₂ laser beam generators.

69. (Previously Presented) A laser unit as set forth in claim 49 further comprising a modulator to produce laser pulses.

70. (Previously Presented) A laser unit as set forth in claim 69, wherein the modulator is a Q-switch.

71. (Canceled)

72. (Canceled)

73. (Currently Amended) A laser unit as set forth in claim ~~72~~49, wherein peak pulse power is at least 100 KW.